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ECONOMIC IMPACT OF SUPERVISED AGRICULTURAL EXPERIENCE IN IOWA: A TREND STUDY

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Abstract

The focus of this article is on the economic impact of Supervised Agricultural Experience (SAE) programs in Iowa using longitudinal data collected from 1991 to 2001. In order to accomplish the purpose of the study, student net income growth, growth of SAE program hours, SAE income per student and per program, and return on investment using tax dollars invested per student-derived income were calculated. The results of this study show that there is a substantial economic impact related to SAE consistent over the entire 11-year period of the study. The total value of SAE income peaked in 2000 with over $20.9 million dollars and grew at an annualized rate of 6.05% from 1991 to 2001. Unpaid SAE program hours grew considerably more annually (20.06%) than paid SAE hours (9.72%). Over the 11-year study, students with a SAE earned $1,443 on average, whereas each agricultural education program earned $55,984. The return on investment ratio using tax dollars invested per student-derived income through SAE was positive each year of the study. Students earn more money through SAE programs than school districts invest in salaries and travel for agricultural education programs.

Introduction

Experiential learning was a vital component of secondary agricultural education programs throughout the country even before courses in vocational agriculture were established as part of the 1917 Smith-Hughes National Vocational Education Act. (Steward & Birkenholz, 1991). The experiential learning portion of agricultural education currently is known as the student's Supervised Agricultural Experience (SAE) program. The SAE is one of three integral components of an agricultural education program. The other two components are classroom/laboratory and leadership/personal development through the National FFA Organization.

SAE is the experiential learning portion of the agricultural education program (Barrick et al., 1992) "because it allows students to apply practices and principles learned in the classroom and to develop new skills and abilities" (Newcomb, McCracken, Warmbrod, & Whittington, 2004, p. 243). Supervised experience improves learning, student personal development, and occupational development (Newcomb et al., 2004), all of which are part of a comprehensive agricultural education program (Phipps & Osborne, 1988).

The three components of a comprehensive agricultural education program supports student learning and development at the secondary agricultural education level. The FFA and SAE components should help equally to provide balance and support to the classroom/laboratory as Retallick (2003) explains using the Tricycle Principle.

Some researchers have raised concern about the role and perception of SAE (Camp, Clarke, & Fallon, 2000; Dyer & Osborne, 1995; Dyer & Williams, 1997; Steele, 1997). Others have attempted to quantify the value of SAE (Graham & Birkenholz, 1999; West & Iverson, 1999). This trend study builds on those studies where the value of SAE has been quantified and provides insight into the economic impact of SAE from 1991 to 2001.

Review of the Literature and Rationale

SAE programs are supported by the curriculum theory espoused by social reconstructionists. According to McNeil (1996), "for the social reconstructionists a learning opportunity must fulfill three criteria: it must be real; it must require action; it must teach values" (p. 36). SAE experiences meet and exceed these criteria in that not only are SAEs real, action-oriented, and value-enhanced, but they serve to transfer theory to practice and create new avenues of theory that generate enthusiasm to learn more. SAE helps develop what can be called a "complete agricultural education package."

SAE participants benefit from the experience, as do the teachers, employers, agricultural education programs, communities, and agricultural industry (Barrick et al., 1992). Most of these benefits result from the opening of communication lines between parents, students, agricultural educators, and employers. This approach allows students to take what they learn in the classroom, apply it in a real situation, and further develop skills toward a career.

One of the most important, yet most challenging aspects of a complete agricultural education program is the SAE (Barrick et al., 1992). Teacher attitudes and expectations toward SAE participation are most influential (Dyer & Osborne, 1995). Teachers fully support SAE conceptually but fail to implement it completely in practice, in part because participation is lacking by all parties (Dyer & Osborne, 1995; Steele, 1997). SAE programs often lack definition, focus, and direction because of changes in curriculum from a total focus on agricultural production to more diverse aspects of agriculture (Dyer & Osborne, 1995). Consequently, agricultural education is in a dilemma (Steele, 1997).

The impact and success of SAE participation cannot always be quantified. The agricultural education instructor is an example. *The Handbook on Supervised Agricultural Experience* states that much of the potential for a successful SAE resides with the teacher (Barrick et al., 1992). In addition, Dyer and Osborne (1995) posit that the strongest influence for participation is based on teacher attitudes and expectations.

Camp et al. (2000) suggest that the scope of agriculture has grown and changed remarkably in the past 50 years. The broad scope of agriculture suggests that the SAE concept must be altered to meet the demands of interested students. Camp et al. also stated that the FFA Organization and its award programs creates boundaries that do not fit today's diverse student body.

It is known that, at least in theory, experiential learning and SAE are critically important components of agricultural education. Two agricultural education studies have indicated that SAE can be economically beneficial. West and Iverson (1999) found the economic value of SAE in the state of Georgia to be over $12 million per year. Using a one-time sampling of the agricultural education programs in their state, they found that 49.8% of SAEs were entrepreneurial, while 25.8% were placement and the remaining 24.4% were improvement programs. It was estimated that the typical agricultural education program in Georgia contributed $71,344 to the local community.

Graham and Birkenholz (1999) studied SAE enrollment and its economic impact on SAE in Missouri from 1988 to 1997. They reported a 55.8% increase in enrollment during that time. SAE participation was relatively stable, increasing only from 83% in 1988 to 84% in 1997. Graham and Birkenholz were concerned that 16% of the agricultural education students in Missouri were not being provided the opportunity to develop skills through an individual SAE program.

In Missouri, the type of SAE programs in which students were participating changed dramatically from 1988 to 1997 (Graham & Birkenholz, 1999). Ownership-related SAE declined by 25.5% and placement increased by 130%. While this emphasis was occurring, the total annual SAE earnings increased by more than $10 million after adjusting for inflation. The SAE earnings in 1997 for Missouri were $31,801,397, representing an increase from $15,686,743 in 1988.

Although the primary purpose of the SAE is to develop skills and abilities leading

toward a potential career, it should not be assumed that this means all students develop an income-generating SAE program. Some students become involved in exploratory programs with no source of income (Barrick et al., 1992). Some students volunteer in an effort to gain experience and skill development without any financial compensation. In those situations, students record their hours for record-keeping and award purposes. These hours are known and recorded as unpaid hours. All students involved in SAE also document the skills and experiences they have developed through their programs.

Graham and Birkenholz (1999) identified several reasons for nonparticipation in SAE. First, there was an increase in nontraditional student enrollment in agricultural education programs in Missouri. Second, and partly because of the first reason, there was a lack of home-based facilities, resources, and support available to students. Finally, there also were instructor issues that were not being addressed. Graham and Birkenholz argued that there was a lack of appropriate training, background, and educational materials available to assist the instructor in working with nontraditional students.

Until 1999, with the publication of papers by West and Iverson (1999) and Graham and Birkenholz (1999), little economic or enrollment research had been published. Many researchers have shown concern for this problem. Dyer and Osborne (1995) reported that, at least through the time of their research, there had been no experimental research or empirical data on the benefits of SAE. The lack of such hard data prevents the profession from promoting SAE accurately or identifying the necessary areas for change. This situation is only compounded when research on supervising SAE has been "noncumulative, making the theoretical base for supervising SAE somewhat fragile" (Dyer & Williams, 1997).

This study expounds on the work of West and Iverson (1999) and Graham and Birkenholz (1999). Not only is the annual value of SAE determined in this study, but income growth, average SAE income, and return on investment ratios also are reported.

Purpose and Objectives

The purpose of this study was to identify the economic impact of SAE programs in Iowa from 1991 to 2001. To accomplish this purpose, four objectives were identified:

1. To determine the income growth for both student net income and unpaid hours,
2. To determine the growth in SAE program hours,
3. To determine the average SAE income per student and per program, and
4. To develop a return on investment ratio using tax dollars invested per student-derived income.

Methods and Procedures

This study is part of a larger study that focuses on the participation trends of Iowa agricultural education programs using longitudinal data collected from several sources. One facet of the larger study was to determine the economic growth and impact of SAE in Iowa. Therefore, the focus of this paper is on the economic portion of the study.

The Iowa Governor's Council on Agricultural Education (2001) in conjunction with the Iowa Department of Education has collected data on SAE annually since the 1990-1991 school year (Bureau of Technical and Vocational Education, n.d.). These data include the unduplicated number of students enrolled in agricultural education, the number of students with SAE programs, as well as the number of unpaid and paid SAE hours, and the actual net earned income through SAE (Table 1).

Table 1
SAE Information from Iowa Agricultural Education Programs

Year	Agricultural Education Enrollment (Unduplicated)	SAE Programs (# of students)	SAE Unpaid Hours (# of hours)	SAE Paid Hours (# of hours)	SAE Net Income (Actual Earned $)	Programs Reporting	Total Claims
1991	9,000	6,969	128,306	981,896	$9,177,611	318	$6,970,178
1992	9,040	8,410	222,320	1,187,040	$10,779,230	311	$7,286,436
1993	10,994	9,758	364,899	1,364,318	$9,528,208	290	$7,370,501
1994	11,663	11,108	447,680	1,469,054	$9,364,513	282	$7,647,856
1995	12,784	10,235	507,572	1,797,227	$10,603,307	272	$7,371,685
1996	13,440	11,327	884,612	1,964,136	$12,240,619	268	$7,637,927
1997	14,373	11,760	573,148	2,293,558	$13,529,236	267	$8,106,234
1998	15,140	11,878	593,298	2,029,544	$12,970,891	267	$8,649,668
1999	14,990	11,654	587,510	3,342,020	$13,025,517	275	$9,072,997
2000	15,543	11,712	836,956	2,708,253	$15,985,424	251	$9,255,217
2001	15,871	11,120	798,480	2,482,915	$14,123,895	248	$9,592,738

Additional data for this study were provided by the Bureau of Financial and Information Service within the Iowa Department of Education (Iowa Department of Education, 2002), including the number of programs reporting and total claims. The programs reporting are those school districts that claim state and federal reimbursement for agricultural education travel and salary expenses. The total claims data were collected annually as part of the requirements for local school districts to receive state and federal reimbursement for their agricultural education programs and represents the money spent on salary and travel.

In order to determine a net SAE income for all SAE programs including those with unpaid hours, a value has to be placed on unpaid hours. The literature review provided no procedure for handling this issue, so the authors chose to calculate an average hourly wage. The advantage of using the average wage is that it better reflects what the actual income would have been had income been received. The disadvantage is that the average is fluid and changes each year and may or may not truly represent the actual value of those unpaid hours.

All dollars were adjusted for inflation and are reported in 2001 dollars. The Consumer Price Index (CPI) was used to adjust for inflation (Bureau of Labor Statistics, 2002). The real dollars, using 2001 as the base year, are the dollars reported throughout the study.

Growth rates also were calculated as a means to identify the economic growth of income. The growth rates used in this study are annualized rates and represent the rate of growth between 1991 and 2001.

The average income per student with a SAE program was calculated. Total value of SAE income was divided by the number of SAE programs (number of students) reporting to determine SAE income per participant. The average income per

program was calculated using the total value of SAE income and programs reporting. The average income per program was calculated by dividing the total value of income by the number of programs.

Based on Christiansen's (1999) suggestions for improvement to previous SAE economic research, a return on investment was calculated. Student income and expenses for agricultural programs claimed by the school district were used to calculate a return on investment made in agricultural education programs. A return on investment was calculated for each year by dividing the total claim amounts by the total value of SAE income. The purpose of the return on investment calculation was to illustrate the financial opportunities students have as part of an agricultural education program. Although the entire SAE dollar amount cannot be attributed solely and directly to the agricultural education program, it does provide some insight into the economic impact of such programs and student experiences.

Results/Findings

The purpose of this study was to identify the economic impact of SAE program in Iowa from 1991 to 2001. The first objective to accomplish the purpose was to determine the income growth for both student and net income and unpaid hours. Earned income is still the primary source of total SAE income, representing $14.1 million of the total $18.6 million earned through SAE income in 2001 (Table 2). Over the 11 years of the study, earned income grew moderately at an annual rate of 4.41%, while the value of unpaid hours grew at a relatively high rate (14.24%). Total SAE income grew at an annual rate of 6.05%.

Table 2
Growth Rates of Net Income and Unpaid Hours

Year	Earned Income	Value of Unpaid	Total Value of SAE
1991	$9,177,611	$1,199,254	$10,376,864
1992	$10,779,230	$2,018,835	$12,798,065
1993	$9,528,208	$2,548,404	$12,076,612
1994	$9,364,513	$2,853,745	$12,218,257
1995	$10,603,307	$2,994,581	$13,597,888
1996	$12,240,619	$5,512,958	$17,753,577
1997	$13,529,236	$3,380,884	$16,910,121
1998	$12,970,891	$3,791,790	$16,762,680
1999	$13,025,517	$2,289,819	$15,315,336
2000	$15,985,424	$4,940,121	$20,925,545
2001	$14,123,895	$4,542,100	$18,665,995
Growth Rate	4.41%	14.24%	6.05%
11-Year Ave.	$10,663,334	$2,954,869	$13,618,203

The second objective of the study was to determine the growth of SAE program hours (Table 3). The number of unpaid hours grew by 20.06% and paid hours grew by 9.72%. The 11-year average for unpaid hours was 540,435 hours, and the 11-year average for paid hours was 1,965,451 hours.

Table 3
Growth of SAE Program Hours

Year	Unpaid Hours	Paid Hours
1991	128,306	981,896
1992	222,320	1,187,040
1993	364,899	1,364,318
1994	447,680	1,469,054
1995	507,572	1,797,227
1996	884,612	1,964,136
1997	573,148	2,293,558
1998	593,298	2,029,544
1999	587,510	3,342,020
2000	836,956	2,708,253
2001	798,480	2,482,915
Growth Rate	20.06%	9.72%
11-Year Ave.	540,435	1,965,451

The third objective of the study was to determine the average SAE income per student and per program. Each student on average earned $1,443 over the 11 years (Table 4). The lowest income per participant was in 1994 with $1,100. Income per participant peaked in 2000 with an income of $1,787 and then dropped in 2001 to $1,679. The annual growth rate of average annual income per student was 1.21%.

The average income per program increased substantially from 1991 to 2001 (Table 4). The grand mean income per program was $55,948. With the exception of one year (1999), the average income per program increased each year of the study. In 1991, students were earning $32,632 per program and, by 2001, $75,266 per program. The annual growth rate was 8.72% for the average income per program.

Table 4
Growth Per Student and Per Program

Year	Per Student w/ SAE	Per Program
1991	$1,489	$32,632
1992	$1,522	$41,151
1993	$1,238	$41,643
1994	$1,100	$43,327
1995	$1,329	$49,992
1996	$1,567	$66,245
1997	$1,438	$63,334
1998	$1,411	$62,782
1999	$1,314	$55,692
2000	$1,787	$83,369
2001	$1,679	$75,266
Growth Rate	1.21%	8.72%
11 Year Ave.	$1,443	$55,948

The fourth objective of this study was to develop a return on investment ratio using tax dollars invested per student-derived income through SAE. A positive return on investment was realized for each year of the study (Table 5). In two instances (1996 and 2000), the return through SAE was more than double the cost of the program. After peaking in 2000 at $2.20, students with a SAE still earned $1.95 in 2001 for every dollar the district invested in the program. The lowest return was realized in the first year of the study with a return of $1.14. The highest return was $2.20 in 2000. The annual growth of the return on tax dollars was 5.47%.

Table 5
Dollars Returned Through SAE Per Dollar Invested

Year	At Ave $
1991	$1.14
1992	$1.39
1993	$1.34
1994	$1.34
1995	$1.59
1996	$2.06
1997	$1.89
1998	$1.78
1999	$1.59
2000	$2.20
2001	$1.95
Growth Rate	5.47%
11-Year Ave.	$1.66

Conclusions/Recommendations/ Implications

The purpose of this study was to identify the economic impact of SAE in Iowa. The results show a substantial economic impact which has grown consistently over the entire 11 years of the study. The study compliments the SAE research in other states. SAE does have an economic impact in Iowa.

The economic impact reflected in this study supports the role SAE has as a part of a complete agricultural education program. Not only does SAE serve as an experiential means to further students' education and career development, but it also serves as a source of income to further establish SAE programs or finance educational experiences beyond high school. The results of this study support similar results reported from studies conducted in Missouri and Georgia (Graham & Birkenholz, 1999; West & Iverson, 1999)

Several conclusions can be made from the results of this study. Earned income still is the primary source of SAE income, but substantial growth was realized in unpaid hours during the time frame of the study. The growth of unpaid hours may signal a change in the type of SAE programs students are demanding. If this is the case, programmatic and instructional changes may be required. Perhaps this is an area for further research.

Using only SAE net income generated, school districts get a solid return on their agricultural education investment (Table 5).

Students earn more money through SAE programs than school districts invest in salaries and travel for agricultural education programs. This return on investment does not even reflect the additional intangible benefits normally attributed to SAE programs. If an economic value were placed on the intangible benefits, the return would be even higher.

There also are some less obvious conclusions that can be made. Unpaid SAE programs have gained in popularity based on the growth in unpaid hours. There could be numerous reasons for such a change, but any provided in this paper would only be speculative. A second conclusion is that the number of students per program is increasing. This conclusion is based on the fact that income per student has remained relatively unchanged during the study while the income per program has increased substantially. All of this has occurred while the number of programs in the state has declined. The increase of students may have an impact on SAE. However, such a discussion would exceed the purpose of this paper.

Based on this study, three recommendations are suggested. First, because there has been a large increase in unpaid hours, research that focuses on the reason for such growth should be considered. Second, the state-wide data-collection process could be improved to include more detailed information, which could in turn be used for more in-depth analysis. Also, the state data-collection tool and collection methods should be reviewed to ensure reliability.

Finally, all states are challenged to collect agricultural education data from local programs including SAE data. In this era of accountability, information such as that presented in this study will provide valuable documentation on the impact that a complete agricultural education program can have on students. Such aggregate state data not only would help identify trends and programmatic issues, but also could be used for informative purposes in promoting agricultural education and proving its usefulness. If all states were collecting data from their local agricultural education programs, these data then could be collected and utilized to serve similar purposes nationally.

Several implications can be drawn from this study. The summary of economic data provides a profile of the economic impact of SAE. It represents 11 years of data collected systematically from all agricultural education programs in the state of Iowa. Such a complete and longitudinal data source on agricultural education adds reliability and accountability. The data can be used to answer questions related to the economic impact of SAE programs, but even more importantly, these data also are useful in identifying other appropriate questions that those in agricultural education should be asking and preparing to answer.

The following questions should be answered using appropriate data collected from agricultural education instructors who are, on a daily basis, "in the trenches" working with and attempting to make an impact on students:

- In what ways have the needs of agricultural education students changed?
- In what ways have the demographics of students in agricultural education changed?
- If change in student needs or demographics is occurring, what does this mean to curriculum development and other related programmatic offerings?
- What types of students prefer placement experiences over ownership experiences and vice versa?
- What resources are needed to further expand agriscience opportunities to students?
- What can be done to better prepare pre-service teachers for developing, planning, and supervising SAE programs locally?
- How can SAE be improved or modified to make it a better learning experience for the student?
- Are there trends in the data that would lead to certain conclusions or raise questions?

Another primary implication of the study is that student SAE programs have an economic impact in Iowa, and based solely on SAE student income, agricultural education in Iowa is a sound investment. All levels of agricultural education can use this type of information to further promote the benefits and impacts of SAE.

The implication to teacher education programs is that new teachers might be influenced positively by the impact SAE has on student motivation. SAE serves as the tool to motivate student learning. Additionally, the economic impact of SAE might have public relations value to support local programs and activities. The ripple effect of positive SAE experiences goes far beyond the economic impact. The economic impact causes or potentially could cause other positive impacts. For example, these impacts could reflect positively on the image, quality, and resource development of agricultural education.

The experiential learning component of agricultural education (SAE programs) is vital and has a positive economic impact on participants. These findings coincide with previous economic research conducted in other states (Graham & Birkenholz, 1999; West & Iverson, 1999). The findings also support the role experiential learning plays in secondary agricultural education programs. SAE fulfills McNeil's (1996) three criteria of a learning opportunity: "it must be real; it must require action; it must teach values" (p. 36). Participants do benefit from SAE just as Barrick et al. (1992) espoused in the handbook on supervised agricultural experience.

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